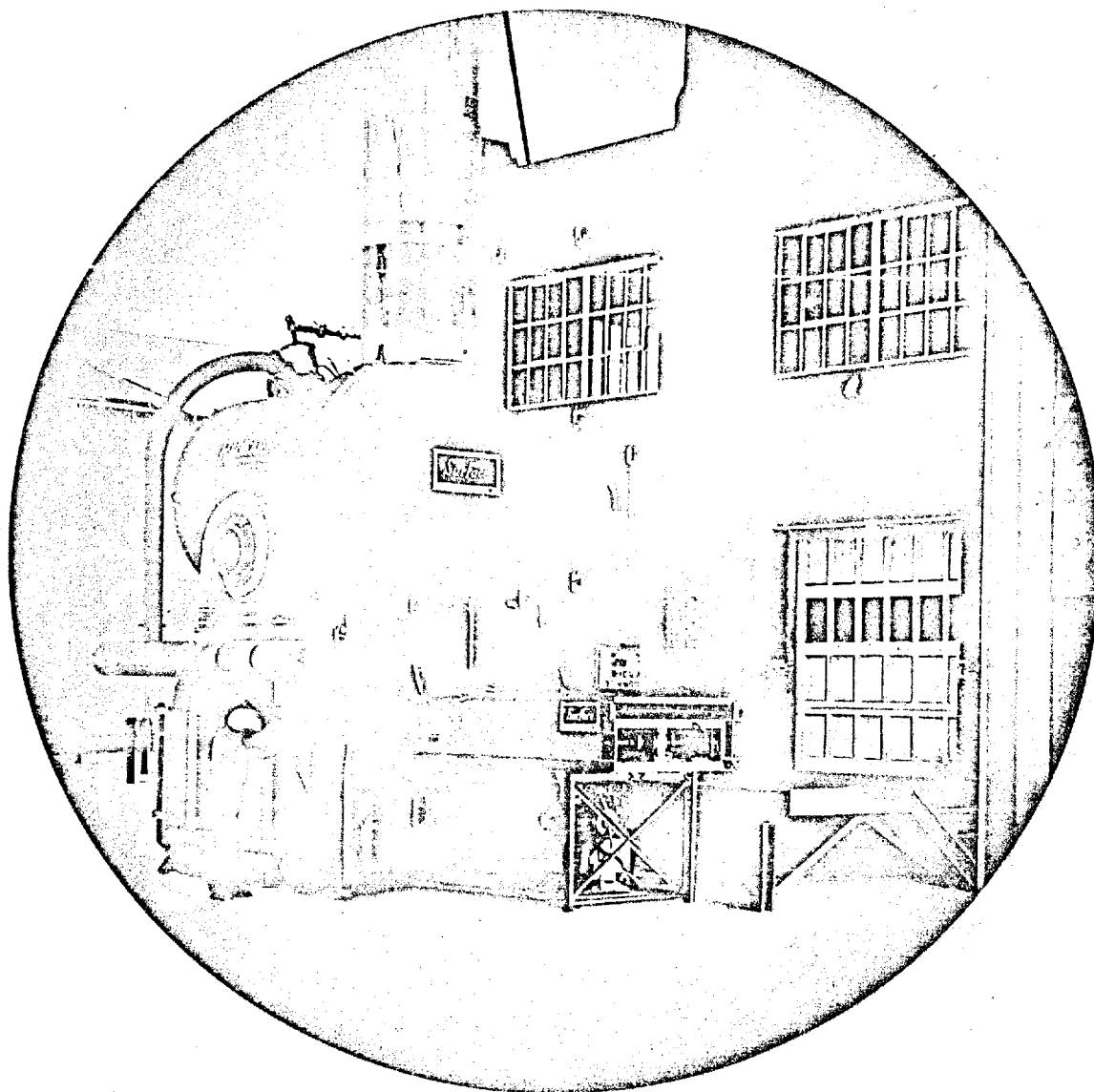


ENVIRONMENTAL CONTROLS, LTD.

605 West Lancaster Ave.
Wayne, Pennsylvania 19087
215-687-4282

Approved For Release 2002/03/25 : CIA-RDP86-00244R000300390034-5

SURFACE
RADIATION
SYSTEMS
SOLID WASTE
DISPOSAL

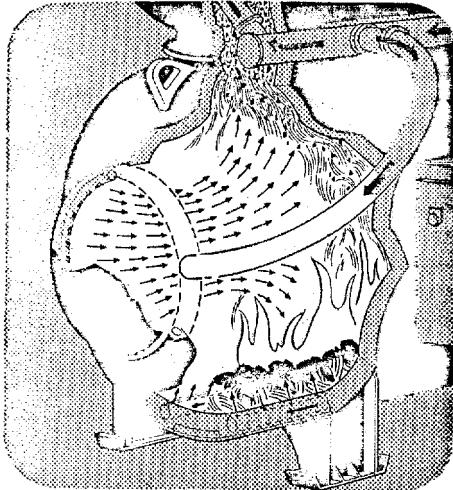


FROM TRASH TO ASH

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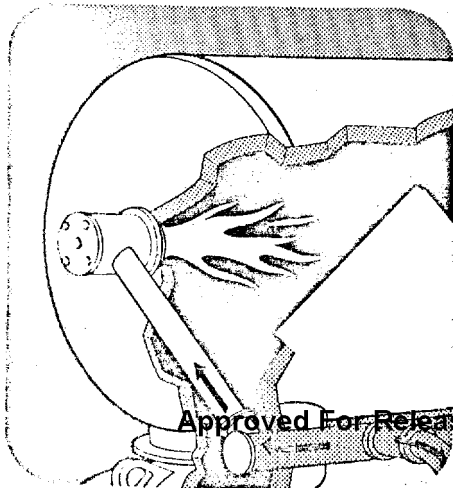
MAIN COMBUSTION CHAMBER

A horizontal steel cylinder with welded convex-closure ends, and lined with special high temperature cast refractory material. Cylinder design gives complete heat reflection for maximum combustion efficiency. Full-diameter cleanout door gives unobstructed access to combustion chamber. Internal passages in chamber for underfire combustion air and external connection for overfire air.



AFTERBURNER

The upper section, a cylinder similar in construction and somewhat smaller in size than the main combustion chamber, reburns the smoke, gases and fumes distilled in the lower chamber. Air only is used in the afterburner section, once the reaction reaches operating temperature of approximately 1500°F. The Airferno principle (patent pending) for air-draft slowdown permits complete carburetion and burning, gives precise particulate control, enables settling of unburned particles so that stack effluent is smoke and odor-free. Gas consumption is minimized since it is used only until operating temperature is reached and is then automatically shut off.



NO-GRATE DESIGN

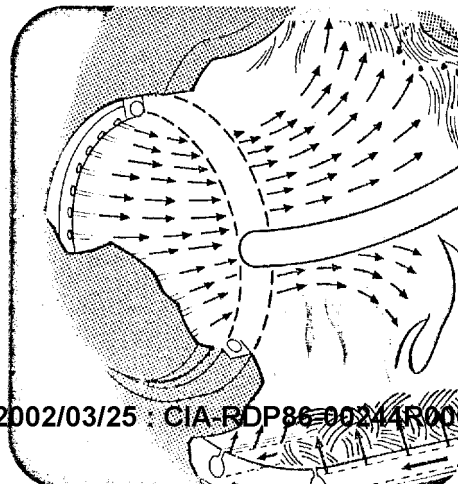
There are no grates to clog or clean, and no grates are necessary. Through an exclusive manifold system incorporating thermocouples, air is automatically metered over and under the fire in the correct proportions so that complete combustion takes place on the floor of the main combustion chamber. Residue can vary from a fine powdery ash to a small clinker, depending on waste being consumed. Metals, glass, bones, plastics, paper, etc. present no problems.

INSULATION

Castable special refractory material lines combustion chambers and doors. Maximum temperature is 2550°F. Insulation is so complete that outer metal shell of Radicator is only just warm to the touch. Insulation life is counted in years, and is readily replaced when such replacement eventually becomes necessary.

EXCLUSIVE AIR-CURTAIN DOOR

Annular ring of compressed air jets around the inside of the air curtain door forms a cone-shaped air blast that blows flames, heat, smoke and flaming particles back into the combustion chamber when charging door is opened. Air curtain operates continuously to insure complete safety for operator.



BLOWER SYSTEM

Pressure air is supplied by an electric motor powered squirrel cage type centrifugal fan. No other incinerator offers a positive, temperature controlled forced-air system.

CONTROLS

Radicator is supplied with foolproof automatic safety controls of fail-safe design. All control components are commercially available for easy maintenance by regular plant personnel or electrician.

LOADING

Trash can be bagged or shoveled into Radicator. It is loaded manually or automatically through charging door in front end unit. Exclusive air-curtain feature (Mark VI and Mark X) confines flames, smoke and heat.

OPERATION

Operating instructions are supplied with Radicator, and burning is automatic once unit has reached operating temperature of 1400°F, generally about 20-30 minutes after initial firing.

ASH REMOVAL

Ashes are raked, shoveled or vacuumed out through large door which gives unobstructed access to main combustion chamber.

SERVICE AND MAINTENANCE

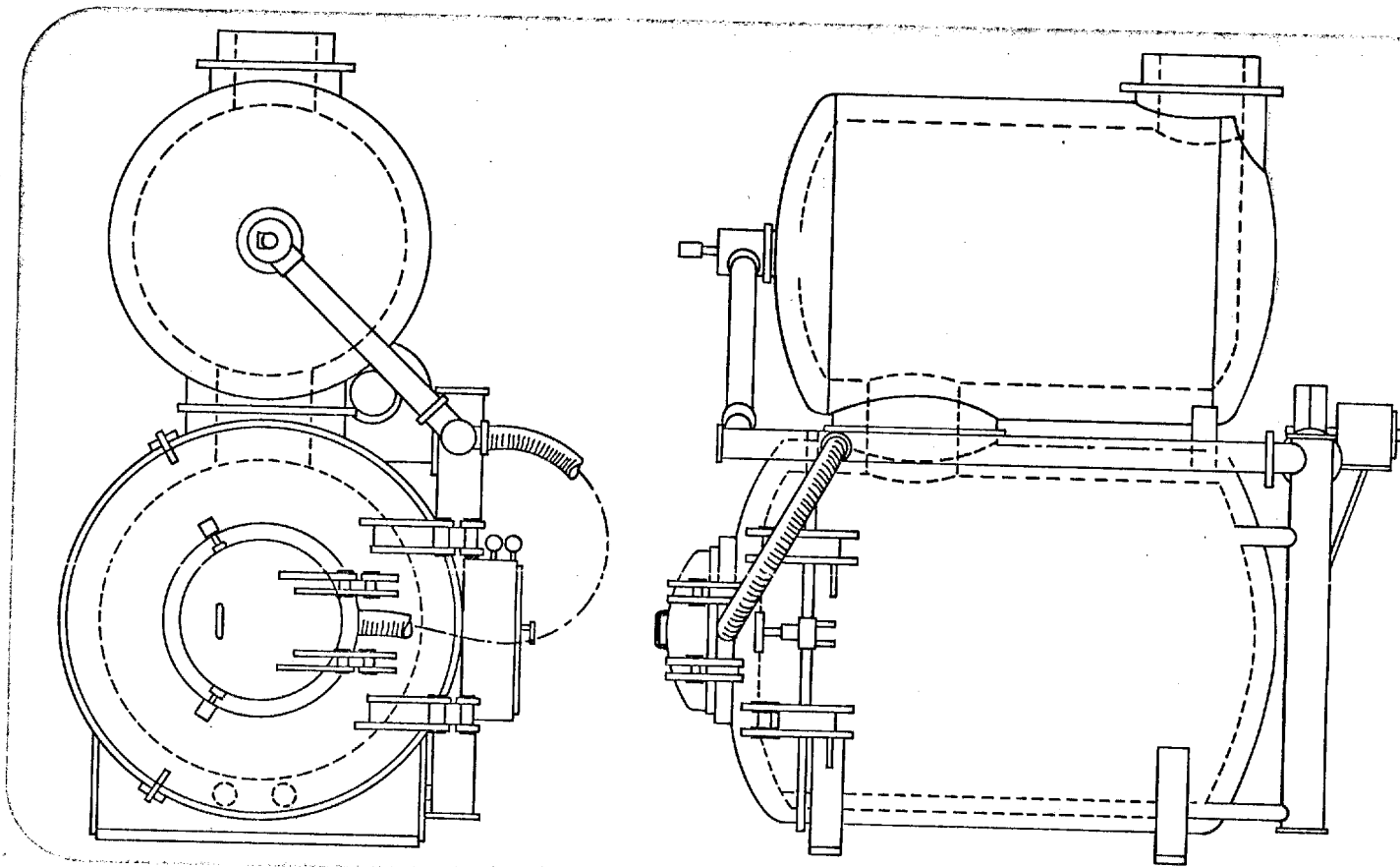
Service life of Radicator should be indefinite. Maintenance can be performed by regular maintenance personnel. No special knowledge, tools or equipment are needed.

LEASE OR PURCHASE

Radicator can be leased or purchased outright, depending on customer's particular requirements. Consult company for specific details, lease figures, or purchase price.

RADICATOR

DESCRIPTION AND TECHNICAL DETAILS



OPERATION

Radicator consists of two "piggy-back" combustion chambers. The unprecedented efficiency of Radicator is accomplished by an automatic solid-state program. These controls blend the precise amounts of time, temperature, and air to produce the most economical and pollution-free operation.

The refuse is loaded into the lower chamber. An air curtain protects the operator and aids combustion efficiency. When the temperature in the lower chamber reaches about 600°F., a gentle stream of air flows over the fire. This causes a continuous precipitation of unburned material and, consequently, complete combustion.

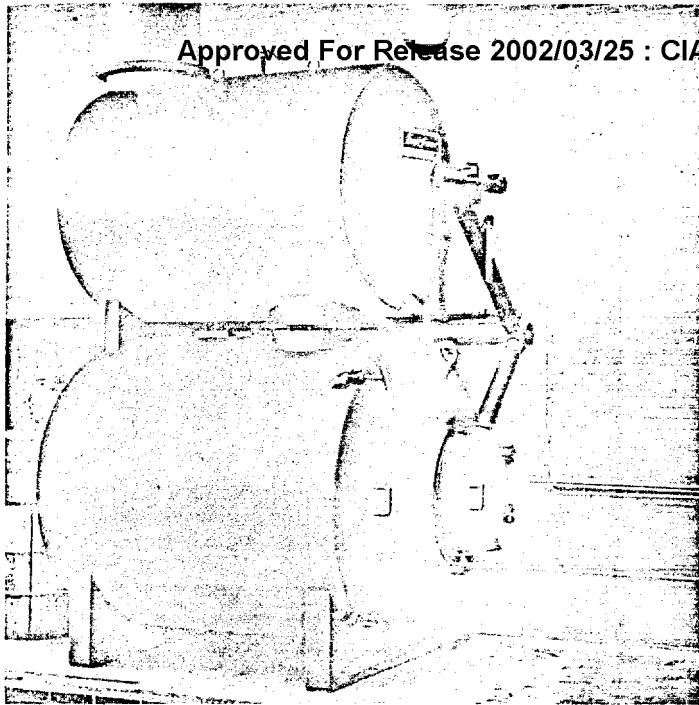
The unburnables drop to the grateless bottom of the chamber and remain. Easy removal is effected by the non-clogging underfire air pans.

The remaining matter, gases and ash, rise to the upper chamber and, due to the angle of entry, are mixed and turbulated, again effecting highly efficient combustion.

An additional stream of air enters this chamber, aiding turbulence and combustion. In a few seconds the approximate 1500°F. temperature effects complete combustion of smoke, odors and gases. All that is visible from the stack is a vapor of clear, clean heat!

When the lower chamber reaches maximum temperature underfire air starts and reduces the unburned carbon in the firebed. A red light signals to the operator that maximum operating temperatures have been reached and that he should stop loading. When the amber light signals, he may then proceed to load. This programming insures that the unit will operate at maximum capacity and under the safest conditions. When Radicator is equipped with optional loading equipment, the programmed controls will not load until suitable operating temperatures are present. This guarantees safe operation possible.

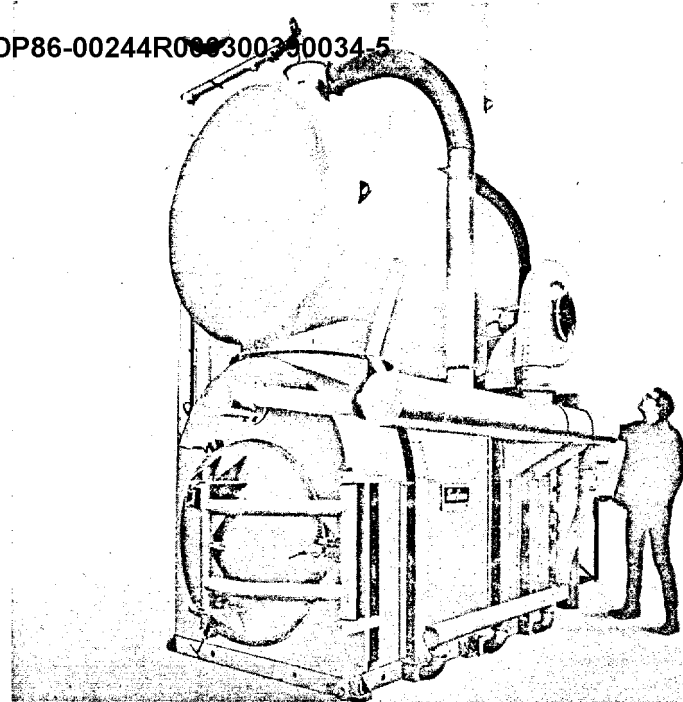
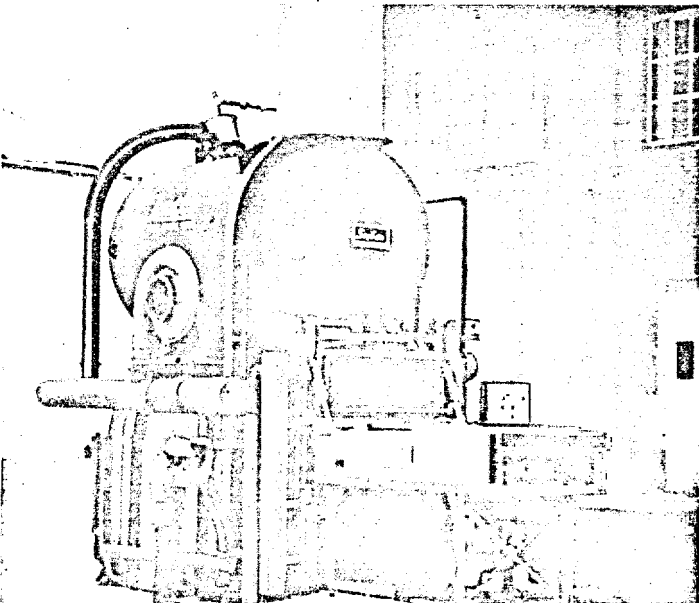
Radicator can be run with many fuels, including propane, butane, oil or gas.



MARK VI: Small but mighty in performance, the MARK VI is the first of the Surface Combustion Incinerators to meet all Department of Health, Education and Welfare requirements and set new industry standards for low-cost maintenance-free operation. Ideal for most hospitals, rest and nursing homes, stores and supermarkets, universities and smaller industrial applications. Consumes 600 lbs. of solid waste per hour. Also available in the following options: pathological; government-approved security burner; wet waste burner; metal recovery furnace. Can be fed by a Radpactor.

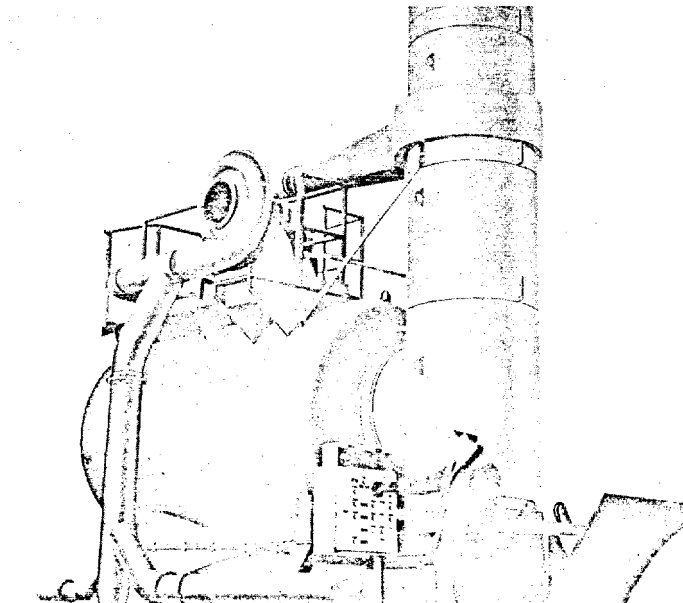
FOUR EFFICIENT RADICATOR MODELS PROVIDE AN ECONOMICAL SOLUTION TO WASTE PROBLEMS FOR ANY SIZE APPLICATION.

MARK XV: Ideal for industrial applications. Tremendous hourly capacity of 1500 lbs., can take initial batch loads through giant front opening. Large loader takes pallets up to 48" x 48" with room to spare. Will accept containerized loads from in-plant material handling or trash collection systems now being designed in America's most modern plants. Operating cost still compares favorably with our smallest model. The only incinerator of its size approved at top capacity by the Department of Health, Education and Welfare. The MARK XV is easily adapted to automatic loading.



MARK X: All the options of the MARK VI are available on the MARK X. Consumes 1000 pounds of waste per hour. Available either for manual or automatic loading. Hospitals and other buildings with an ever-increasing load of disposables find the extra capacity of the MARK X a great advantage in time saving without much increase in operating cost. Larger charging-door facilitates continuous manual usage. Because of the reasonable size and large incinerating capacity of the MARK X we suggest that architects and general contractors give it special consideration.

MARK XX: The only incinerator of its size approved at full capacity by the Department of Health, Education and Welfare. Without question the finest incinerator ever built for large industry or small municipality. The MARK XX puts every modern tool and opportunity for systemization at the disposal of the plant engineer. In fact, systemization is only limited by the imagination and need of the purchaser. Several MARK XX incinerators can be mechanically tied together for incineration up to 10 tons an hour! Enough for a small town or a section of the largest city.



RADIATOR		MARK VI			MARK X			MARK XV			MARK XX		
TYPE OF WASTE		0	1	2	0	1	2	0	1	2	0	1	2
BTU VALUE*		8500	6500	4300	8500	6500	4300	8500	6500	4300	8500	6500	4300
% MOISTURE CONTENT		10	25	50	10	25	50	10	25	50	10	25	50
MAXIMUM CHARGING RATE LBS./HR.		445	625	795	710	1000	1270	1070	1500	1910	1425	2000	2540
OVERALL DIMENSIONS (EXCLUDING STACK)	LENGTH	11' 6"			14'			22' 7"			27' 2"		
	HEIGHT	12' 2"			15'			18' 8"			19'		
	WIDTH	8' 4"			8'			12'			12' 3"		
REQUIRED WORKING AREA		16' 6" x 10'			20' x 11'			27' 7" x 15' 1"			32' 2" x 15' 3"		
STANDARD STACK		20'			20'			40'			44'		
LOW STACK**		Special Application Specs on Request			Special Application Specs on Request			Special Application Specs on Request			Special Application Specs on Request		
WEIGHT/LBS.		22,000			30,000			43,000			63,000		
GAS OR OIL BURNER SIZE		1,000,000 BTU			2,000,000 BTU			4,000,000 BTU Modulated			4,000,000 BTU Modulated		
LOADER DIMENSIONS		Special Application Specs on Request			Special Application Specs on Request			Special Application Specs on Request			Special Application Specs on Request		
CHARGING DOOR DIMENSIONS		27½" ID			29" ID			Automatic Feed			Automatic Feed		
LOADER CAPACITY		Special Application Specs on Request			Special Application Specs on Request			1.6 Cubic Yards			1.6 Cubic Yards 3.0 Cubic Yds. Opt.		
COMBUSTION CHAMBER VOLUME	UPPER	88 Cubic Feet			198 Cubic Feet			312 Cubic Feet			432 Cubic Feet		
	LOWER	140 Cubic Feet			295 Cubic Feet			370 Cubic Feet			540 Cubic Feet		
DWELL TIME		1.25 Seconds			1.50 Seconds			1.50 Seconds			1.60 Seconds		

* Verified by U. S. Environmental Health Service, Department of Health, Education and Welfare.

** Low stacks available with draft inducers.

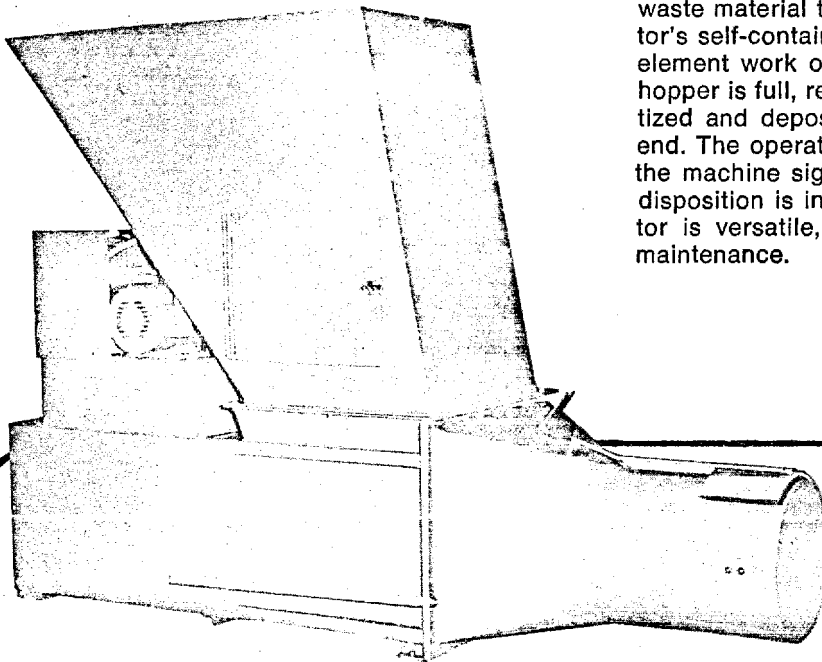
#0 WASTE • HIGHLY COMBUSTIBLE PAPER, WOOD AND INCLUDING
10 PERCENT TREATED PAPER, RUBBER AND PLASTICS.

#1 RUBBISH • COMBUSTIBLE WASTE PAPER, CARTONS, RAGS AND
FLOOR SWEEPINGS.

#2 REFUSE • RUBBISH AND GARBAGE.

ALONE, OR AS PART OF THE RADICATOR SYSTEM, THE RADPACTOR COMPACTS WASTE, ELIMINATES WASTE PROBLEMS

The rugged Radpactor compresses wet or dry solid waste material to one third of its original bulk. Radpactor's self-contained packer press and electro/hydraulic element work on an automatic on-off basis. When the hopper is full, refuse is automatically compressed, sanitized and deposited in bags or cans at the discharge end. The operator need only change receptacles when the machine signals. The recommended procedure for disposition is incineration in a Radicator. The Radpactor is versatile, easily installed and requires minimal maintenance.



- INEXPENSIVE
- EFFICIENT
- SANITARY
- VERSATILE
- RELIABLE

SPECIFICATIONS

Packing Force—44,000 lb.

Main Ram Thrust—26,400 lb.

Main Ram Size—24 x 20 inches

Plug Ram Thrust—17,600 lb.

Plug Ram Size—11 inches in diameter

Cycle Time—20 seconds

Packing Rate—20 cu. ft./minute

Stroke—42 inches

Main Ram Face— $\frac{3}{4}$ -inch steel

Plug Ram Face—1-inch steel

Construction—Outer frame and inner ram of welded steel

Overall Dimensions—96 inches long x 27 inches wide x 46 $\frac{1}{2}$ inches high

Weight—Approximately 1,500 lb.

Pad—No special required

Cylinders (3)—3 $\frac{1}{4}$ and 2 $\frac{1}{4}$ i.d.

Line Pressure—2,500 p.s.i.

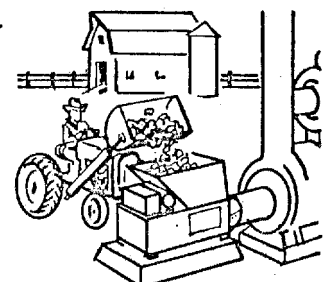
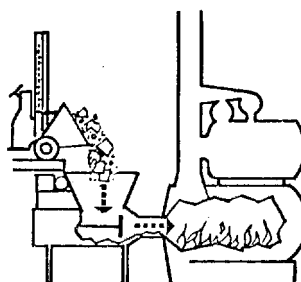
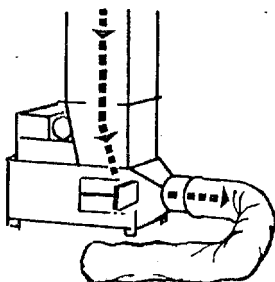
Pump—7 $\frac{1}{2}$ gallons/minute

Reservoir—20 gallons

Motor—5 hp., 1,800 r.p.m.

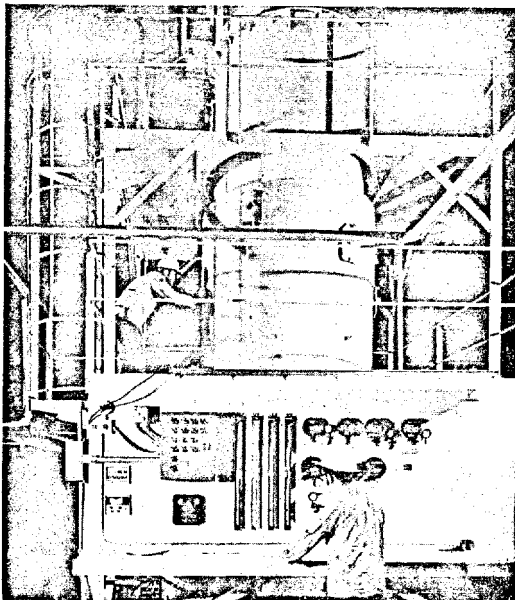
Electrical—208/230 v., 3-phase, 60 cycle

Control Circuit—115 v.



BLUMHARDT COLLECTION IS

An unique organization whose business is the application of ENERGY TECHNOLOGY to systems, equipment and services to meet the demands of the total marketplace of industry, government and private enterprise. We are a research and engineering organization of good size and structure and today we are devoting much of our total resources to the development and manufacture of environmental control equipment. *Surface* incinerators are designed to meet or exceed the most critical air pollution regulations. If the standard equipment line will not meet a specific disposal problem, special units can be designed and manufactured to special order. *Surface is headquarters* for incinerators to handle solid, liquid, and fume wastes. *Surface* is the leader in environmental control equipment. Call on us.



The Surface liquid waste incinerator you buy will be backed by years of laboratory and field testing. We've proved it tough and thorough. And everything you need for standard operation arrives at your plant site either built-in or ready for simple installation on a concrete base.

		\$5.00	\$5.00
Cost per 100 gallons			
	\$2.73		
\$.77			
concentrate	dilute	concentrate	dilute
Surface Incinerator		Commercial Disposal	

Cost Per 100 Gallons. This chart shows how quickly a Surface liquid incinerator can pay for itself. (Figures are based on Model L180-48-40 and commercial disposal costs of 5¢/gallon, and utility rates of 50¢/MCF Natural gas and 1½¢/KW power).

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PROVED!

FUME INCINERATORS FOR ANY VELOCITY OR AIR CHEMICAL COMPOSITION

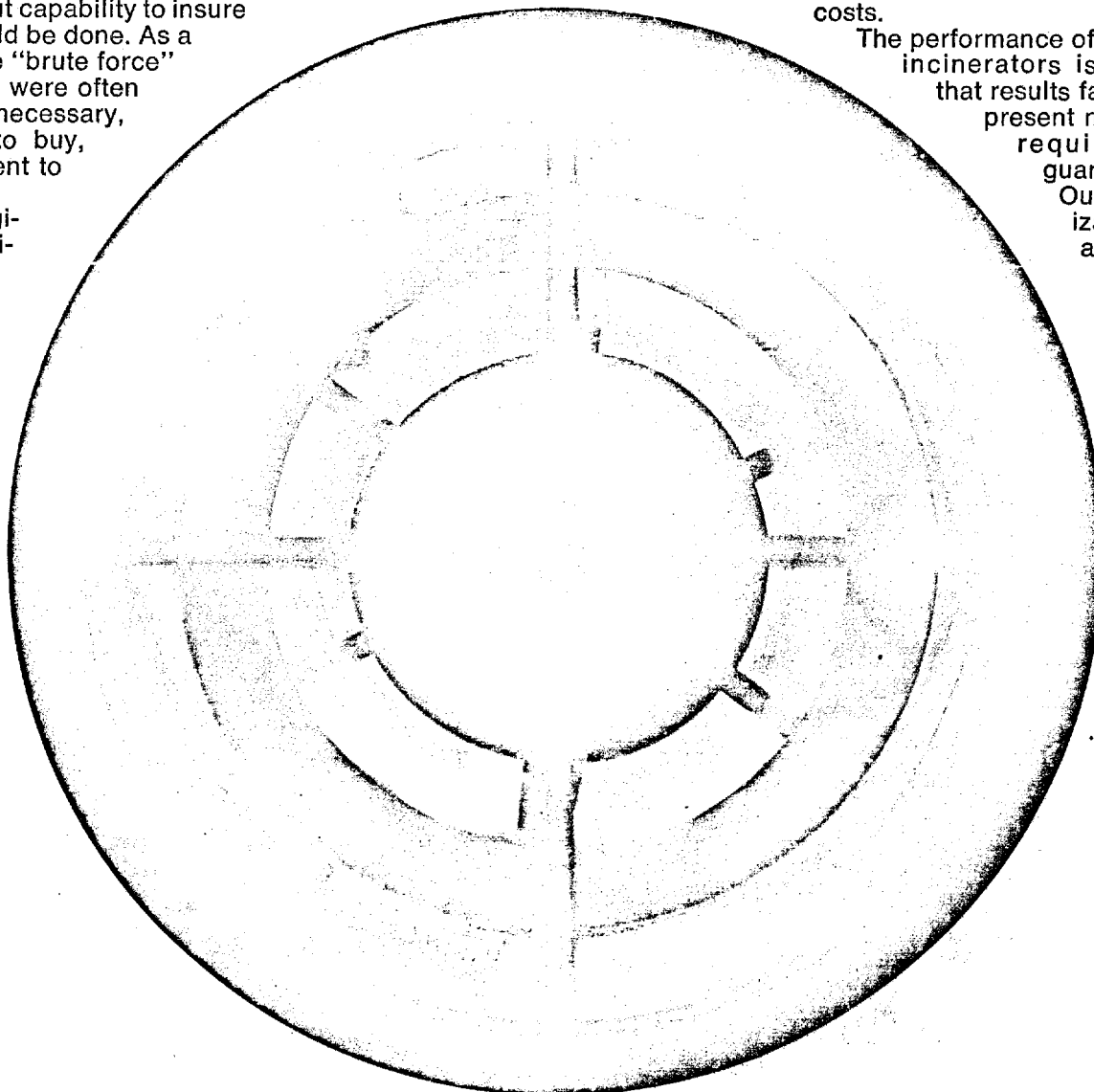
Surface fume incinerators replace the old "brute force" methods of industrial air pollution control. Because equipment makers knew relatively little about the basic reaction chemistry of fume and vapor oxidation, they tended to build excessively large incinerators with more than enough input capability to insure the job would be done. As a result, these "brute force" incinerators were often larger than necessary, expensive to buy, and inefficient to operate. Surface engineers investigated these problems in a two-year Research & Development program which studied

such factors as basic reaction kinetics, mixing efficiency, temperature uniformity, residence time, and burner configuration.

The result is a modern line of industrial fume incinerators which combine maximum efficiency with minimum investment and operating costs.

The performance of Surface fume incinerators is so efficient that results far in excess of present minimum code requirements are guaranteed.

Our sales organization reaches across America and Canada. Call or write when you're ready to let us give you the solution to your air pollution problems.



In Canada:
SURFACE COMBUSTION DIVISION
Midland-Ross of Canada, Limited
Toronto, Ontario, Canada
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SURFACE COMBUSTION DIVISION

Midland-Ross Corporation



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